

12.0 HYDROLOGY & WATER QUALITY

This section provides an overview of the hydrology and water quality of the Greenway Vision project area, and discusses potential project impacts. Potential impacts are analyzed at a programmatic level rather than a project-specific level, since the locations of trails, staging areas, and other amenities discussed in the Vision are approximate. Consequently, all analysis presented below will serve as a framework for addressing potential hydrology and water quality impacts associated with the future implementation of individual projects described in the Vision.

12.1 Environmental Setting

This section presents an overview of the hydrologic setting of the Greenway Vision project area. Project area characteristics addressed include:

- Hydrology
- Surface Water Quality
- Groundwater

12.1.1 Regional Setting

The proposed project is located within the Sacramento River Basin, which is bounded by the Sierra Nevada to the east, the Coast Ranges to the west, the Cascade Range and Trinity Mountains to the north, and the Delta-Central Sierra area to the south. The Sacramento River is the principal river in the basin. Its major tributaries are the Pit and McCloud Rivers, which join the Sacramento River from the north, and the Feather and American Rivers, which are tributaries from the east.

12.1.2 Project Area Setting (Dry Creek Watershed)

Hydrology

The distribution of water within a watershed depends upon many factors, including climate, topography, geology and soils, vegetation, and land use.

The Dry Creek watershed encompasses approximately 65,000 acres, with approximately 52,500 acres located in Placer County. The watershed is composed of six major sub-basins and includes the following eight named waterways: Dry Creek, Clover Valley Creek, Antelope Creek, Secret Ravine, Miners Ravine, Cirby Creek, Linda Creek, and Strap Ravine. Dry Creek is formed by the confluence of Secret Ravine and Antelope Creek near Sunrise Boulevard and Interstate 80. Clover Valley and Antelope Creeks drain the northwest portion of the watershed, and Secret Ravine drains the central portion. Miners Ravine drains the south-central and eastern portion, and Linda and Cirby Creeks comprise the southeastern sub-basins, with Strap Ravine comprising a small tributary discharging into Linda Creek. Miners Ravine, Secret Ravine, Antelope Creek and Dry Creek are perennial streams, flowing year-round. Clover Valley Creek, Linda Creek, Cirby Creek, and Strap Ravine were noted as intermittent in 1997 (Bishop 1997), but a recent report lists these tributaries as perennial (Foothill Associates 2003b).

The Mediterranean climate of the watershed has summers that are hot and dry with temperatures usually above 90°F while winters are mild and rainy with occasional temperatures below freezing. Winter temperatures range from an average low of 40°F to an average high of 57°F. Average summer temperatures range from a low of 70°F to a high of 90°F, with temperatures in excess of 100°F being fairly common. Annual precipitation averages 25 inches, 90 percent of which falls from November through April.

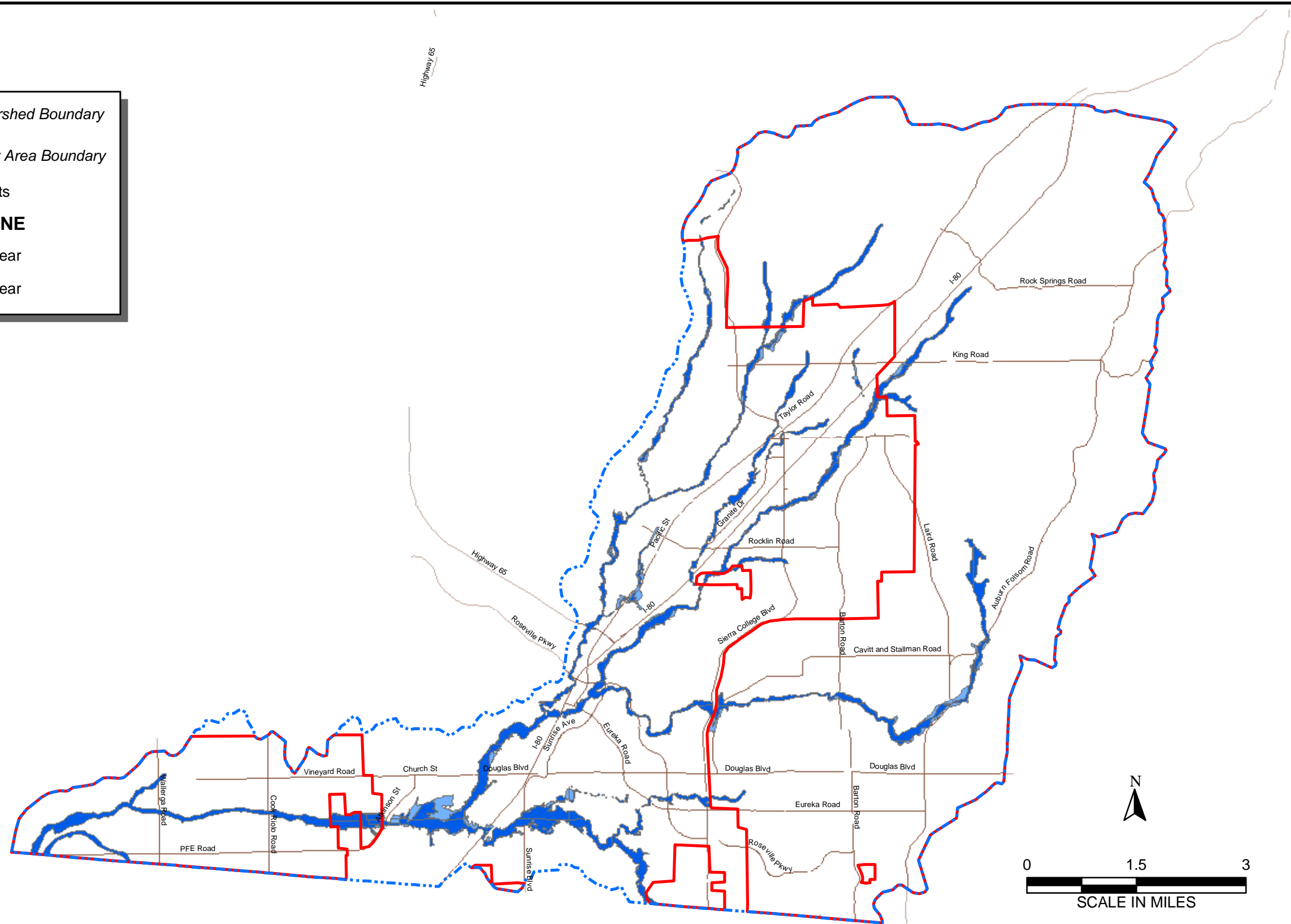
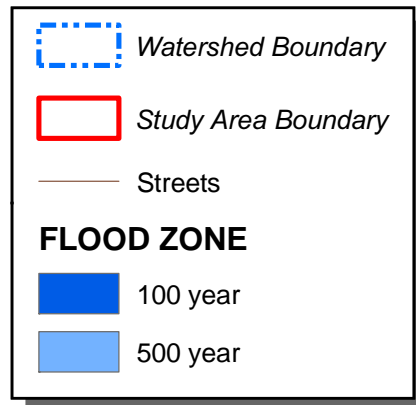
The watershed topography ranges from relatively flat along Dry Creek in the southern and western portion of the watershed, to gently rolling hills in the mid-reaches of the watershed, to more prominent steeper hills and varied terrain in the upper regions of the watershed. Elevations of the project area watershed range from approximately 1,230 feet above MSL at the headwaters of Secret Ravine to approximately 70 feet above MSL at the downstream study area boundary, where Dry Creek crosses the Placer-Sacramento County line. Clover Valley Creek, Antelope Creek, Secret Ravine and Miners Ravine have similar topography, with headwaters in the upper elevations of the watershed and mouths in the broader and flatter valley. These streams have generally steeper average profiles than Dry Creek, Linda Creek, Cirby Creek and Strap Ravine, which lie mostly within the valley floor.

Soils within the Dry Creek watershed differ based upon landscape position and underlying geology. Most soils in the area are formed from granitic or volcanic parent material, and often include a claypan, hardpan, or other consolidated layer that impedes water permeability (ECORP 2003). The higher elevations within the Dry Creek watershed often have shallow soils and rock outcrops.

Land uses in the watershed include agricultural, varying densities of residential, commercial, industrial, and open space. Increased development is changing the nature of the watershed to higher density land uses and increased urban and suburban uses, particularly in the lower portions of the watershed. In the middle and upper watershed, most of the streams are within private residential land use designations with less of these areas designated as open space. Increased development creates more impervious surfaces (streets, structures, parking lots, and driveways) which in turn increases surface runoff. The quantity of this increased surface runoff can create the potential for flooding while the quality of the runoff can impact water quality.

Flooding

Flooding occurs when the conveyance capacity of a channel is exceeded. This phenomenon usually occurs from above average runoff caused by precipitation or snowmelt, but may also be the result of manmade causes. Areas within Placer County subject to 100-year (1 percent chance) and 500-year (0.2 percent chance) flooding are generally confined to the areas adjacent to the county's local rivers and streams. Figure 12-1 shows the FEMA designated 100-year floodplain within the Placer County portion of the Dry Creek watershed.



FEMA FLOOD PLAINS

Surface Water Quality

Surface water quality is most affected by land development, agriculture, grazing, and urban runoff. Other potential pollutants come from automobile and truck traffic on existing roads, residences, and land uses on adjacent properties to creeks and streams. These pollutants, such as hydrocarbons and heavy metals, may occur in minimal concentrations. Nutrients such as phosphate and nitrogen compounds may also be present at low levels.

The pollutants present in urban runoff can vary in concentration due to elapsed time between rainfall events, length and intensity of the precipitation events, and surrounding land uses and practices. The greatest concentration of pollutants typically occurs during the first runoff generating precipitation event after the dry season (“first flush”) as it transports contaminants from surfaces and upper soil layers.

Groundwater

The Dry Creek watershed lies above the Sacramento Valley groundwater basin in the North American subbasin. Depth to groundwater is approximately 161 feet below ground surface in the upper watershed to 13 feet below ground surface in the lower watershed. Groundwater resources are primarily limited to the lower half of the watershed and little or no groundwater flows into or out of the Sacramento basin from the Sierra Nevada bedrock. Under predevelopment (natural) conditions, this aquifer was recharged by seepage from streams and channels running from the mountains into the valley area (ECORP 2003).

From the 1860’s to the 1960’s, groundwater hydraulic head dropped 40 to 80 feet within the lower aquifer in this area. By 1975 the levels were moving back to predevelopment levels due to increased use of surface water resources as opposed to ground water (ECORP 2003). However, well monitoring in the project area by the California Department of Water Resources has indicated a consistent drop in well water surface elevations which could be due to low recharge, high withdrawal rates or a combination of both (Placer County 1990).

Most soils in the area are formed from granitic or volcanic parent material, and often include a claypan, hardpan, or other consolidated layer that impedes water permeability (ECORP 2003). This limits the recharge capability in many areas within the watershed. Groundwater is recharged primarily through the streams and creeks within the watershed.

12.2 Regulatory Setting

There are several agencies with jurisdiction over flood control and water quality activities in the project area. These agencies include the State Water Resources Control Board (SWRCB), FEMA, and Placer County.

12.2.1 Federal and State

U.S. Environmental Protection Agency (EPA)

The 1972 Federal Water Pollution Control Act, also known as the Clean Water Act (CWA), establishes the basic structure for the EPA to regulate discharges of pollutant into waters of the United States.

Section 401 of the CWA (33 U.S.C. 1341) requires any applicant for a federal license or permit to conduct any activity that may result in a discharge of a pollutant into WOUS to obtain a water quality certification that assumes the discharge would comply with the applicable effluent limitations and water quality standards. This policy is intended to preserve wetland values or acres, and seeks to avoid adverse impacts and to offset unavoidable adverse impacts to existing aquatic resources through mitigation to achieve no net loss of wetland function and value.

The CWA was amended in 1987 with the addition of Section 402(p), which established a framework for regulating storm water discharges under the National Pollutant Discharge Elimination System (NPDES). The NPDES permit system was established in the CWA to regulate point source pollution such as municipal and industrial discharges to surface waters of the U.S. In California, the EPA has given the state authority to administer the NPDES program, which is implemented by the State Water Resources Control Board (SWRCB).

Nonpoint pollution sources originate over a wide area rather than from a definable point. Such nonpoint sources are generally exempt from federal NPDES permit program requirements with the exception of storm water discharges. Stormwater discharges after project construction can transport pollutants from impervious surfaces such as roads and bike trails to creeks and streams. NPDES municipal Phase II regulations require jurisdictions to initiate actions to prevent long term non-point pollution through appropriate design. Placer County operates under a General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems and has developed a Stormwater Management Plan. The goal of the NPDES nonpoint source regulations is to improve the quality of storm water discharged to receiving waters to the “maximum extent practicable” through the use of Best Management Practices (BMPs).

In accordance with NPDES regulations, to minimize the potential effects of construction runoff on receiving water quality, the SWRCB requires that any construction activity affecting one acre or more must obtain coverage under the General Construction Activity Stormwater Permit (General Permit). Permit applicants are also required to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) that specifies erosion and sediment control BMPs to reduce or eliminate construction-related impacts on receiving water quality. Construction of specific Greenway projects that would disturb one acre or more will be required to obtain coverage under the General Permit, develop and implement a SWPPP and perform regular inspections of all BMPs.

Examples of construction BMPs identified in SWPPPs include: using temporary mulching, seeding or other stabilization measures to protect uncovered soils; storing materials and equipment to ensure that spills or leaks cannot enter the storm drain system or surface water; developing and implementing a spill prevention and cleanup plan, installing traps, filters, or other devices at drop inlets to prevent contaminants from entering storm drains; and using barriers, such as straw wattles or silt fencing to minimize the amount of uncontrolled runoff that could enter storm drain inlets or surface water.

The effect of this regulatory environment is that projects need to be managed carefully (i.e. BMPs are properly implemented, monitored and maintained).

State Water Resources Control Board

Section 303 of the Clean Water Act (CWA) requires states to adopt water quality standards for all surface waters of the United States. Where multiple beneficial uses exist, water quality standards must protect the most sensitive use. Water quality standards are numeric and/or narrative criteria.

The SWRCB and the nine Regional Water Quality Control Boards (Regional Boards) are responsible for ensuring implementation and compliance with the provision of the federal CWA and California's Porter-Cologne Water Quality Control Act. The project area is situated within the jurisdiction of the Central Valley Regional Water Quality Control Board (CVRWQCB).

Section 13260 of the California Water Code requires a Report of Waste Discharge (ROWD) for persons discharging or proposing to discharge waste that could affect the quality of the waters of the State. Generally, activities that involve discharges such as those to land or groundwater or from diffused sources must file a ROWD with the appropriate Regional Board in order to obtain Waste Discharge Requirements (WDRs). WDRs may include effluent limitations, as well as monitoring and reporting requirements.

Regional Boards have the authority to implement water quality protection standards through the issuance of permits for discharges to waters at locations within their jurisdiction and through multiple enforcement mechanisms. Regional water quality objectives for all water bodies in the Sacramento and San Joaquin watersheds (including Dry Creek and its tributaries) are specified in the Water Quality Control Plan (Basin Plan) for the Sacramento and San Joaquin River Basins, prepared by the Central Valley RWQCB in compliance with the federal CWA and the State Porter-Cologne Water Quality Control Act. Section III of the Basin Plan contains both narrative and numeric water quality objectives that are intended to protect these beneficial uses. The water quality criteria contained in the Basin Plan have been developed to protect the designated beneficial uses of the area.

12.2.2 Local (Placer County)

Local policies and regulations relevant to the proposed project include Placer County regulations and requirements outlined in the Placer County General Plan, the Dry Creek-West Placer Community Plan, the Granite Bay Community Plan, and the Horseshoe Bar/Penryn Community Plan. The Greenway Vision and implementation recommendations were planned specifically to identify and emphasize common shared values as expressed in existing goals and policies of regional jurisdictions. As such, the Vision components are designed to be consistent with the goals and policies of Placer County and unincorporated community plan areas. As future projects are proposed for implementation, they would be individually evaluated for consistency with General Plan and community plans' goals and policies. Although the cities of Roseville and Rocklin and the Town of Loomis are not adopting the Greenway Vision, those communities outside of the proposed project area have adopted many similar goals and policies.

The policies listed below were excerpted from a review of the Placer County General Plan, Dry Creek-West Placer Community Plan, Granite Bay Community Plan, and Horseshoe Bar/Penryn Community Plan. Because many of the policies found in the community plans are similar to

those contained in the county-wide Placer County General Plan, only policies unique to particular community plans are listed.

Placer County General Plan

Policies:

- 4.E.4. The County shall ensure that new storm drainage systems are designed in conformance with the Placer County Flood Control and Water Conservation District (PCFCWCD) *Stormwater Management Manual* and the County *Land Development Manual*.
- 4.E.5. The County shall continue to implement and enforce its Grading Ordinance and Flood Damage Prevention Ordinance.
- 4.E.6. The County shall continue to support the programs and policies of the watershed flood control plans developed by the PCFCWCD.
- 4.E.10. The County shall strive to improve the quality of runoff from urban and suburban development through use of appropriate and feasible mitigation measures including, but not limited to, artificial wetlands, grassy swales, infiltration/sedimentation basins, riparian setbacks, oil/grit separators, and other best management practices (BMPs).
- 4.E.12. The County shall encourage project designs that minimize drainage concentrations and impervious coverage and maintain, to the extent feasible, natural site drainage conditions.
- 4.F.2. The County shall recognize floodplains as a potential public resource to be managed and maintained for the public's benefit.

Dry Creek West Placer Community Plan

Policies – Natural Resources:

- 3. Seek to maintain or improve the quality of water in the major creeks, especially Dry Creek and its tributaries.
- 10. Improve water quality in the aquifer and the Dry Creek watershed by eliminating existing water pollution sources and by discouraging activities which include the use of hazardous materials around wetland and recharge areas.
- 14. No construction activities shall occur within the Dry Creek floodplain and only limited alteration of its tributaries shall be permitted except as part of the development of the floodplain as a recreational area, or for stream enhancement, or where work is done in accordance with the Placer County Flood Damage Prevention Ordinance, Department of Fish and Game Regulations, and Clean Water Act Provisions administered by the U.S. Army Corps of Engineers.

Policies – Open Space:

- 17. Stream corridors shall be left in an open, natural condition, except for structures or uses which are compatible with stream corridors.

Horseshoe Bar/Penryn Community Plan

Policies – Hydrology and Water Quality:

3. Seek to maintain or improve the quality of waters in Secret Ravine, Miners Ravine, Antelope Creek, and Mormon Ravine.

Placer County Regulations

In addition to the policies discussed above, other applicable regulations that will apply to the Greenway site specific projects include Placer County's Flood Damage Prevention Ordinance, the Stormwater Management Manual, and the Grading and Erosion Prevention Ordinance.

The County's Flood Damage Prevention Ordinance implements floodplain management in the county, and limits construction in areas within the 100-year flood zone to prevent damage to structures and to limit the effect of development on flood elevations.

Regulatory and permitting issues related to flood control are the responsibility of the Placer County Engineering and Surveying Department.

Flood control services in Placer County are provided by the PCFCWCD. In 1984 the State Legislature established the District for the entire area of Placer County in order to address flood control issues related to growth through increased development. The District is an advisory body that is governed by a Board of Directors consisting of a representative from each of the six incorporated cities in Placer County, two representatives from the Board of Supervisors, one member-at-large appointed by the Board of Supervisors, and representatives of various organizations. The PCFCWCD is responsible for the creation and updating of the Placer County Flood Control and Water Conservation District Stormwater Management Manual. The Manual contains goals, policies, and regulatory requirements for the development and management of natural resources and stormwater infrastructure and facilities.

The Placer County Grading and Erosion Prevention Ordinance regulates development grading activities with emphasis on erosion prevention and control and protection of water quality.

12.3 Environmental Impacts

12.3.1 Criteria for Significance

Hydrological and water quality impacts are considered significant if the project has the potential to:

1. Violate any water quality, including groundwater, criteria or waste discharge requirements.
2. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted).

3. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site.
4. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site.
5. Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff.
6. Otherwise substantially degrade water quality.
7. Place housing within a 100-year flood hazard area.
8. Place within a 100-year flood hazard area structures which would impede or redirect flood flows.
9. Expose people or structures to significant risk of loss, injury, or death from flooding.

12.3.2 Impacts to Hydrology and Water Quality

Impact 12-1:	Grading and construction impacts to water quality.
Significance:	Potentially Significant
Mitigation Measures:	Mitigation Measure 12-1a, Obtain coverage under the General Construction Stormwater Permit and prepare a Storm Water Pollution Prevention Plan (SWPPP) for site-specific projects; and 12-1b, Conduct grading and construction operations in conformance with applicable County standards as outlined in the Placer County Land Development Manual, including the Grading, Erosion and Sediment Control Ordinance.
Significance after Mitigation:	Less than Significant

Increasing area of disturbed soils leads to increased erosion. Currently, runoff at future project areas may be transporting sediment containing small amounts of nutrients, naturally occurring metals and mineral, pesticides, and organic matter. Increasing erosion rates will increase the contaminant loading into the creeks. Construction related runoff would be considered a potentially significant impact.

For all projects disturbing one acre or more, coverage under the General Permit will be obtained prior to performing any land disturbing activities. As part of the requirements of the General Permit, a Storm Water Pollution Prevention Plan (SWPPP) will be prepared for site specific projects. The SWPPP will be designed to reduce or eliminate pollutant non-storm water discharges to surface waters. The SWPPP will specify the implementation of site-specific Best Management Practices (BMPs) utilizing the best available technology (BAT) economically achievable and best conventional pollutant control technology (BCT).

Monitoring of the BMPs will be performed pursuant to the requirements of the General Permit. Implementation of BMPs will help meet storm water discharge water quality criteria for the proposed projects by capturing and preventing pollutants from entering area waterways. Monitoring of all BMPs shall be performed for the duration of coverage under the General Permit. Monitoring consists of performing routine and storm-based site inspections and making specific recommendations to the project manager, such as installing additional BMPs and performing maintenance on existing BMPs.

Typical construction-related (temporary) BMPs that could be implemented as part of the proposed project include, but are not limited to, the following:

- Proper installation of erosion control measures to all disturbed areas including, but not limited to, the installation of straw mulch, hydraulic mulch, hydroseed, and erosion control blankets.
- Proper installation of sediment control measures below all areas that have a moderate to high potential for erosion.

In addition to coverage under the General Permit, construction of project features, including trails, parking, and other amenities, shall be conducted in accordance with the requirements of the Placer County Land Development Manual, including the Grading and Erosion Prevention Ordinance.

The implementation of the above requirements will reduce the impacts of construction related storm water runoff to less than significant.

Impact 12-2:	Post-construction storm water runoff impacts on water quality.
Significance:	Potentially Significant
Mitigation Measures:	Mitigation Measure 12-2, Conduct site specific analyses.
Significance after Mitigation:	Less than Significant

Post-construction storm water runoff from future site specific projects could potentially contain contaminants that can degrade water quality. The use of paved and unpaved trails could increase the types or quantities of non-naturally occurring pollutants in runoff. In high enough concentrations, oil and greases, coliform bacteria, petroleum hydrocarbons, nitrogen, phosphorus, and heavy metals have the potential to impact fisheries and other beneficial uses such as recreation, domestic water supply and cold water habitat.

In addition to the potential for storm water runoff to contain pollutants, increased runoff from areas of impervious surfaces increases the potential for erosion. Once particles become dislodged and suspended, they have the potential to degrade beneficial uses in the area. Beneficial uses may be impaired by increased erosion in the future site specific project areas in the following ways:

- deposition of these particles off-site can impact spawning habitat.

- deposition of these particles off-site can decrease storm water storage and conveyance capacity leading to increased flooding potential.
- sediments that remain in suspension in high concentrations may adversely affect aquatic life due to the associated increase in pollutants typically attached to sediment.

Without mitigation, these impacts are considered potentially significant. Mitigation is proposed that future Greenway projects conduct a site specific analysis and implement its recommendations (including any low impact development design recommendations) to insure that post-construction runoff is minimized and that impacts to water quality are less than significant.

Impact 12-3:	Increased runoff leading to localized or downstream flooding.
Significance:	Potentially Significant
Mitigation Measures:	Mitigation Measure 12-3, Conduct a site specific analysis to insure that no substantial increase in water surface elevation results from installation of Greenway features and comply with the County's Land Development Manual and Stormwater Management Manual.
Significance after Mitigation:	Less than Significant

Although the Greenway trails and amenities add only a small amount of impervious surfaces to the existing open space areas, their potential locations within the floodplain and/or riparian areas may create additional runoff that could lead to localized or downstream flooding. Mitigation requires that future projects conduct a site specific analysis and implement measures (including low impact development methods) to insure that no substantial increase in water surface elevation results from installation of Greenway features. Mitigation also requires compliance with the County's Land Development Manual and Stormwater Management Manual.

Impact 12-4:	Impacts to groundwater resources.
Significance:	Less than significant
Mitigation Measures:	None Required

As the majority of the groundwater recharge within the watershed occurs directly through the creeks and streams, the small amount of additional impervious area created by the proposed paved trails is not expected to significantly impact groundwater resources. This is a less than significant impact.

Impact 12-5:	Expose people or structures to a significant risk of loss, injury, or death involving flooding.
Significance:	Potentially Significant
Mitigation Measures:	Mitigation Measure 12-5, Install warning signage and install temporary barriers at unsafe and/or impassable locations during potential flood events.

Due to the seasonal nature of precipitation within the watershed, residents and visitors that would utilize the Greenway during the dry season may become insensitive to wet season flooding

hazards along the corridors. Warning signs (either permanent or seasonal) can alert trail users about the potential dangers from flooding along Greenway corridors. In addition to signage, barricades at specific unsafe and/or impassable locations during flood events would provide further warning.

12.4 Mitigation Measures

Mitigation Measure 12-1a: As required by the NPDES, obtain coverage and maintain compliance under the General Construction Stormwater Permit and prepare a SWPPP for site-specific projects. Mitigation Measure 12-1a applies to impact 12-1.

Mitigation Measure 12-1b: Conduct grading and construction operations in conformance with applicable County standards as outlined in the Placer County Land Development Manual, including the Grading, Erosion and Sediment Control Ordinance. Mitigation Measure 12-1b applies to impact 12-1.

Mitigation Measure 12-2: Conduct a site-specific analysis for Greenway projects proposed in areas of flood risk and/or high erosion potential, and incorporate necessary changes in final trail location and/or design to minimize post construction runoff and impacts to water quality. Include low impact development (LID) measures as appropriate, including minimum 25 foot buffers between constructed trails and creeks, sheet flow abatement, and bio-retention approaches such as swales and vegetated open spaces. Mitigation Measure 12-2 applies to Impact 12-2.

Mitigation Measure 12-3: Conduct a site-specific analysis for Greenway projects proposed in areas of flood risk, and incorporate necessary changes in final trail location and/or design to minimize impacts to water conveyance. Include low impact development (LID) measures as appropriate, including minimum 25 foot buffers between constructed trails and creeks, sheet flow abatement, and bio-retention approaches such as swales and vegetated open spaces. Comply with the County's Land Development Manual and Stormwater Management Manual. Mitigation Measure 12-3 applies to Impact 12-3.

Site specific analysis must evaluate the specific projects' impact on peak flow rates at downstream locations, the potential for overloading of the actual or designed capacity of existing storm water and flood-carrying facilities, and the potential for alteration of the 100-year floodplain boundaries. The final project design shall comply with applicable elements of the Placer County Flood Damage Prevention Ordinance and the PCFCWCD Stormwater Management Manual. Final design and location should insure that no substantial increase in water surface elevation results from installation of Greenway features.

Mitigation Measure 12-5: Install warning signage and install temporary barriers at unsafe and/or impassable locations during potential flood events. Mitigation Measure 12-5 applies to Impact 12-5.

Warning signage may be permanent and posted at appropriate flood prone locations throughout the Greenway trail system. Barriers should be temporary and shall be placed at specific hazard points as needed during flood events.

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